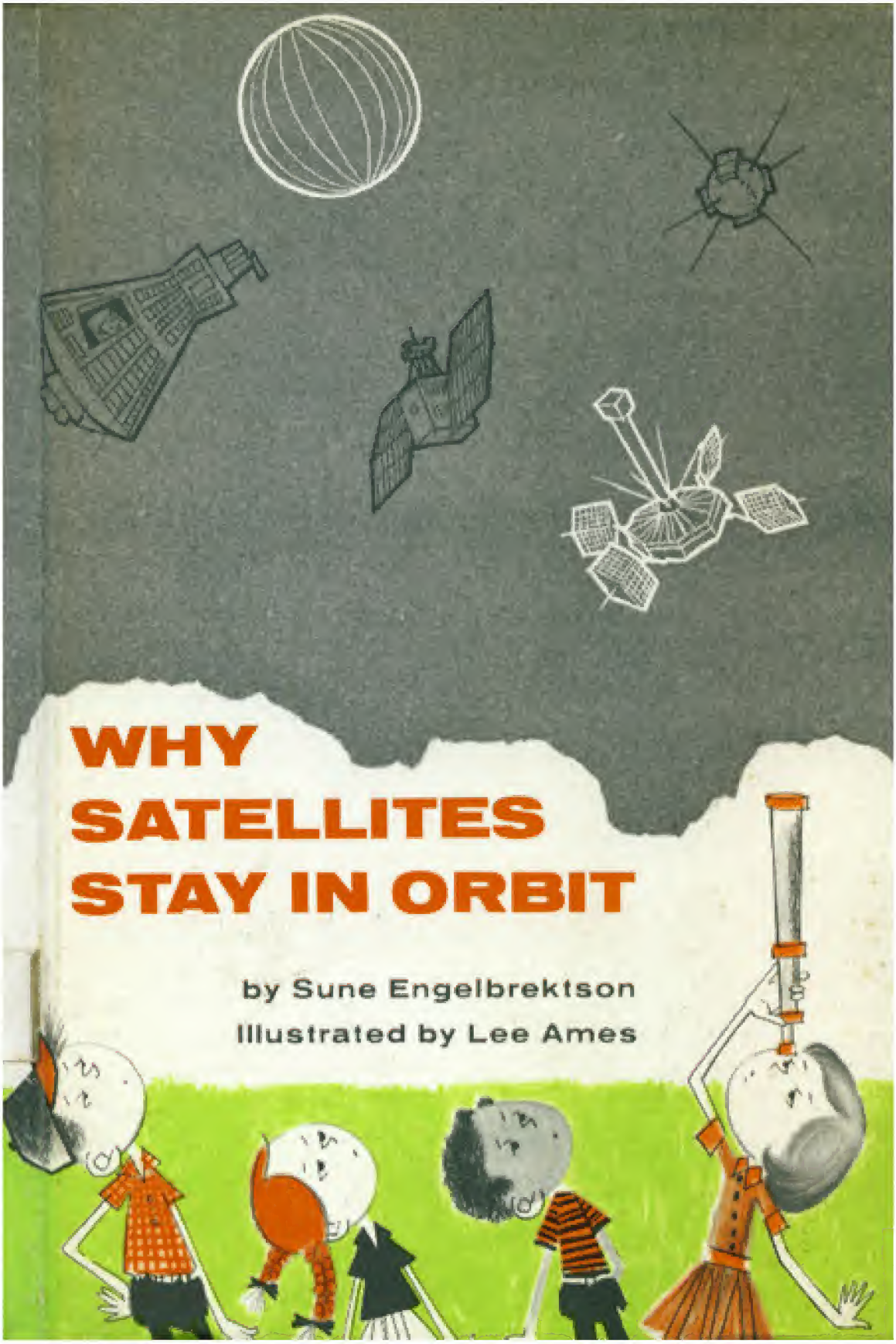


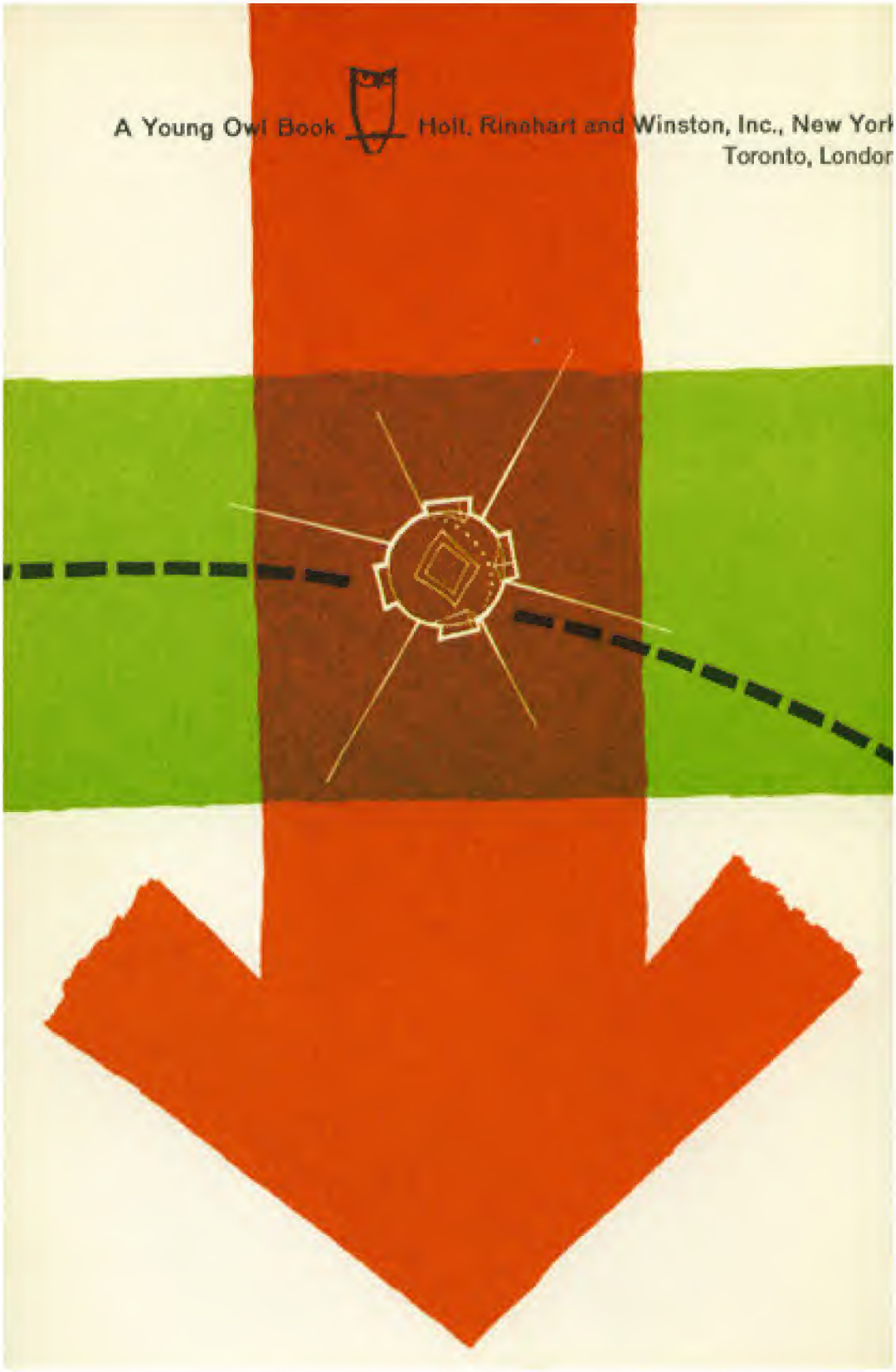
WHY SATELLITES STAY IN ORBIT

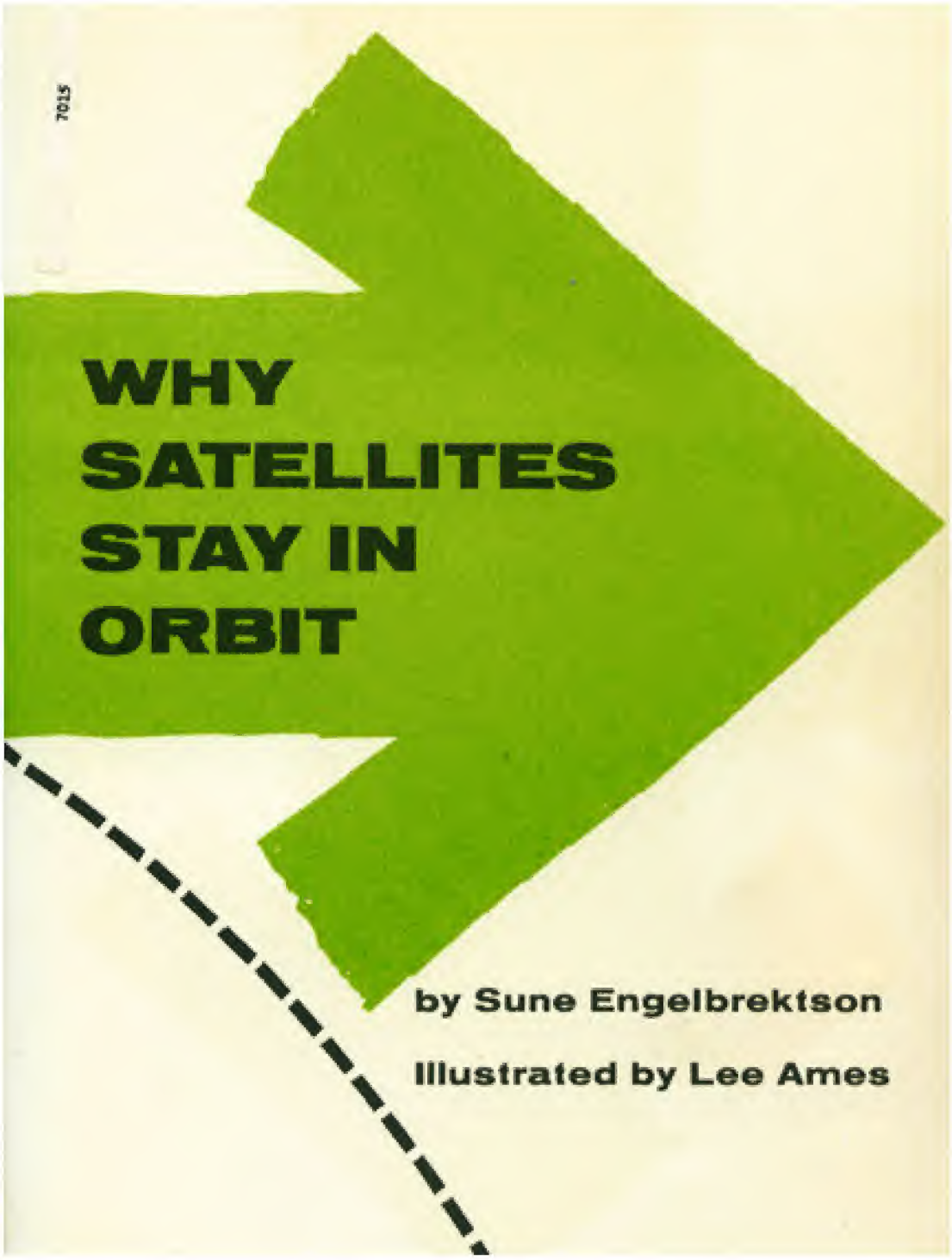
by Sune Engelbrektson

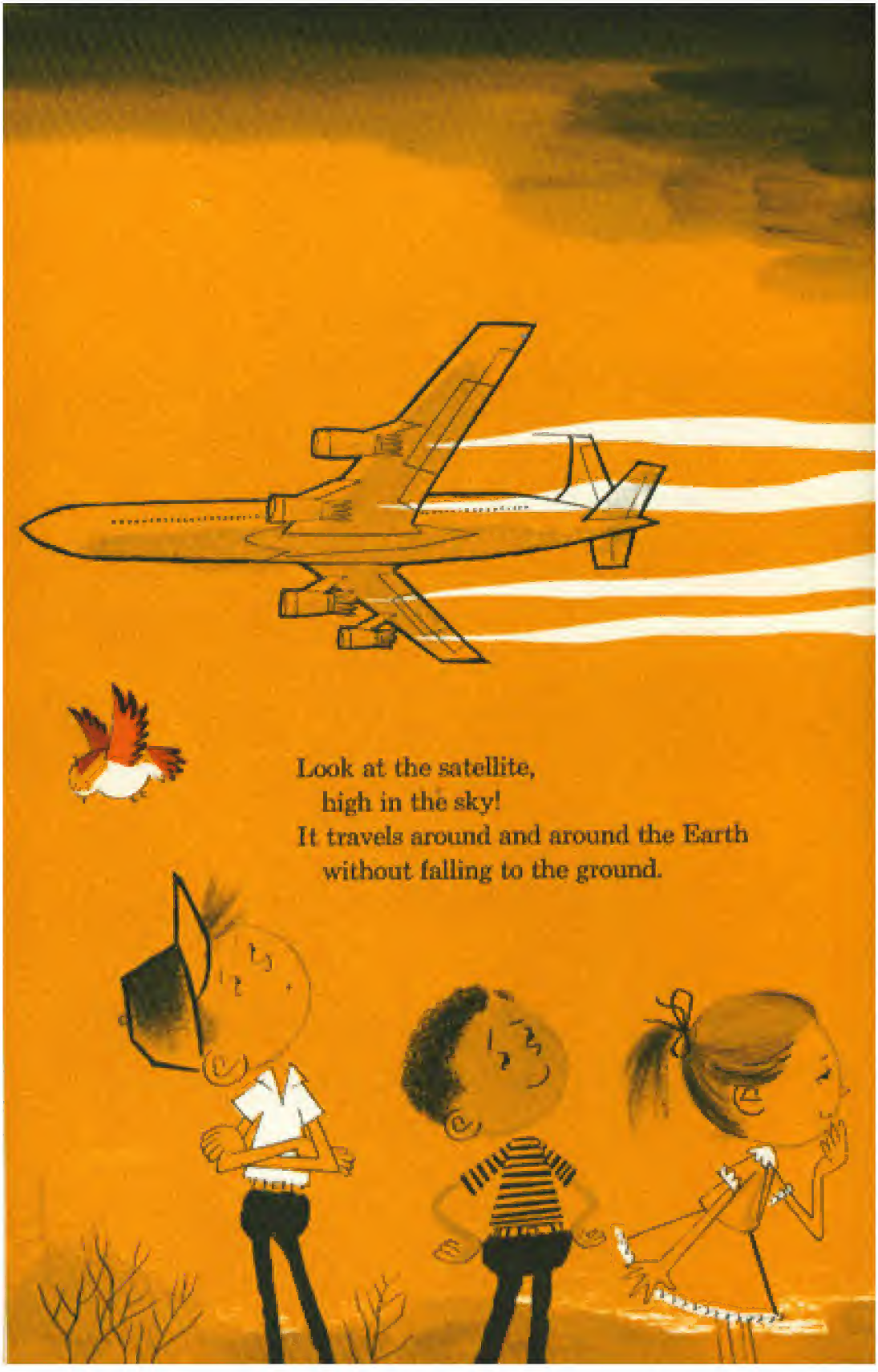
Illustrated by Lee Ames


RIPPLING WOODS ELEM. SCHOOL
7015
629.4 EMG
WHY SATELLITES STAY IN ORBIT.
Holt, Rinehart and Winston, Inc.

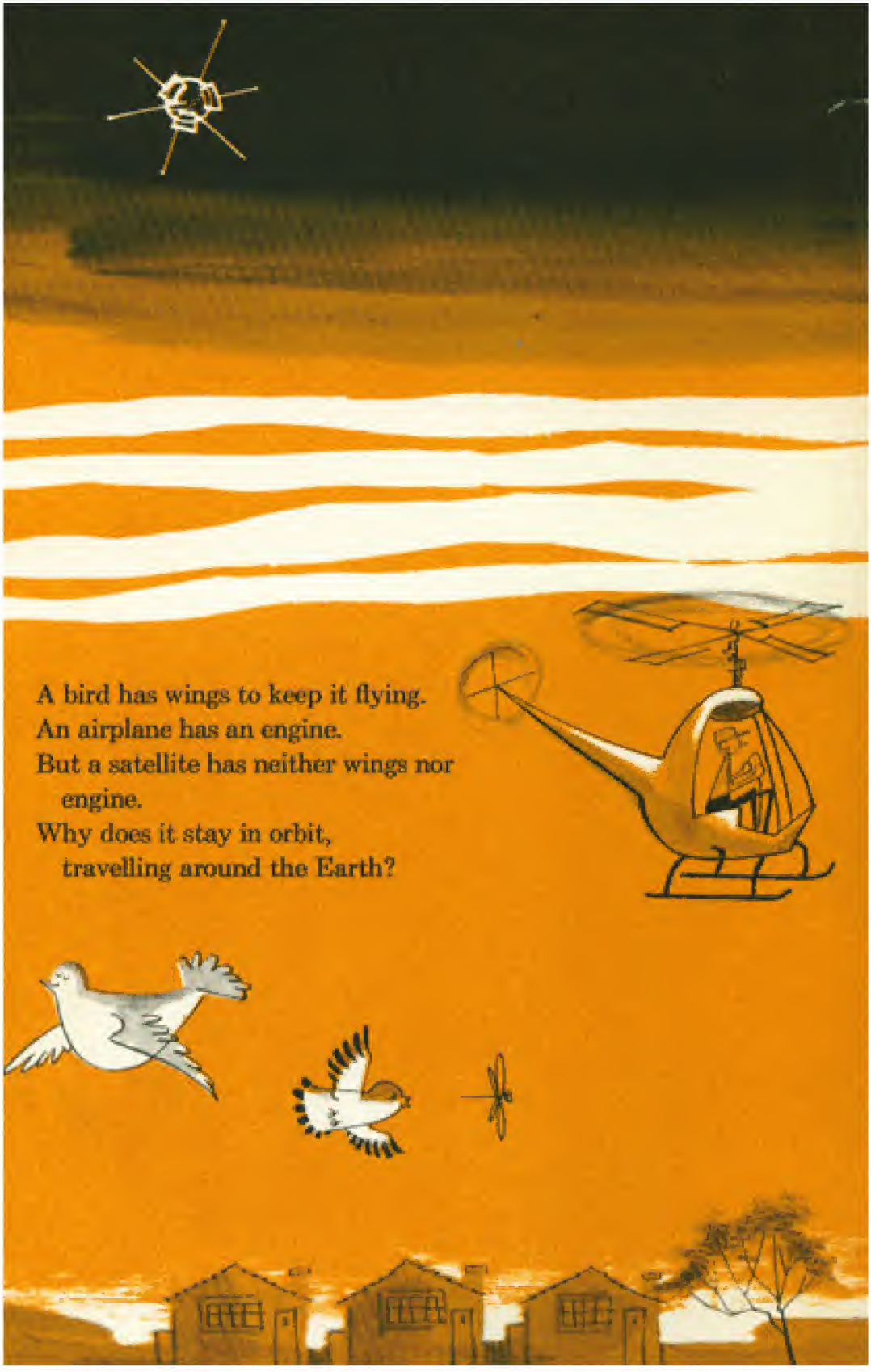
A Young Owl Book
Holt, Rinehart and Winston, Inc., New York
Toronto, London



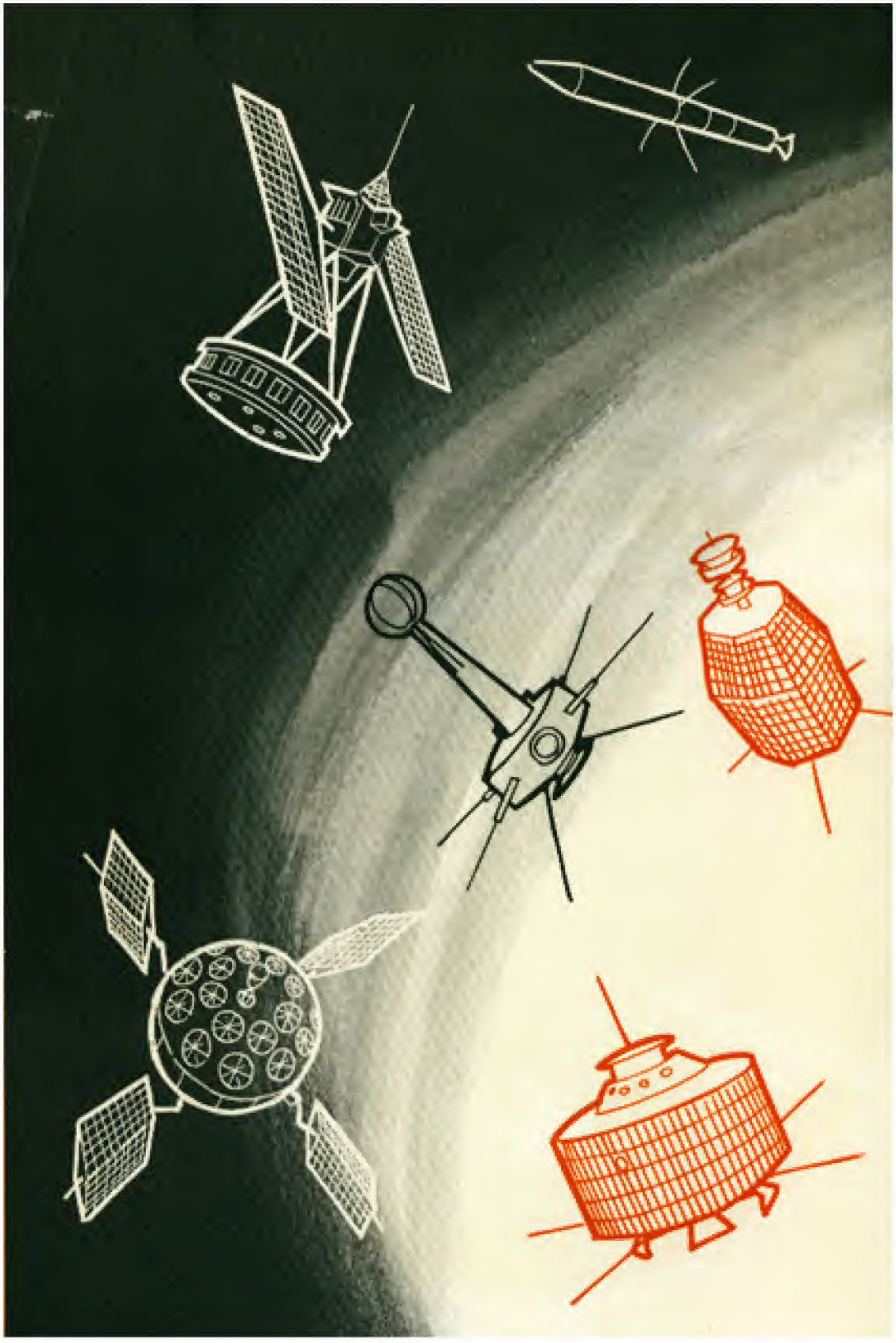

7015
WHY SATELLITES STAY IN ORBIT
by Sune Engelbrektson
Illustrated by Lee Ames

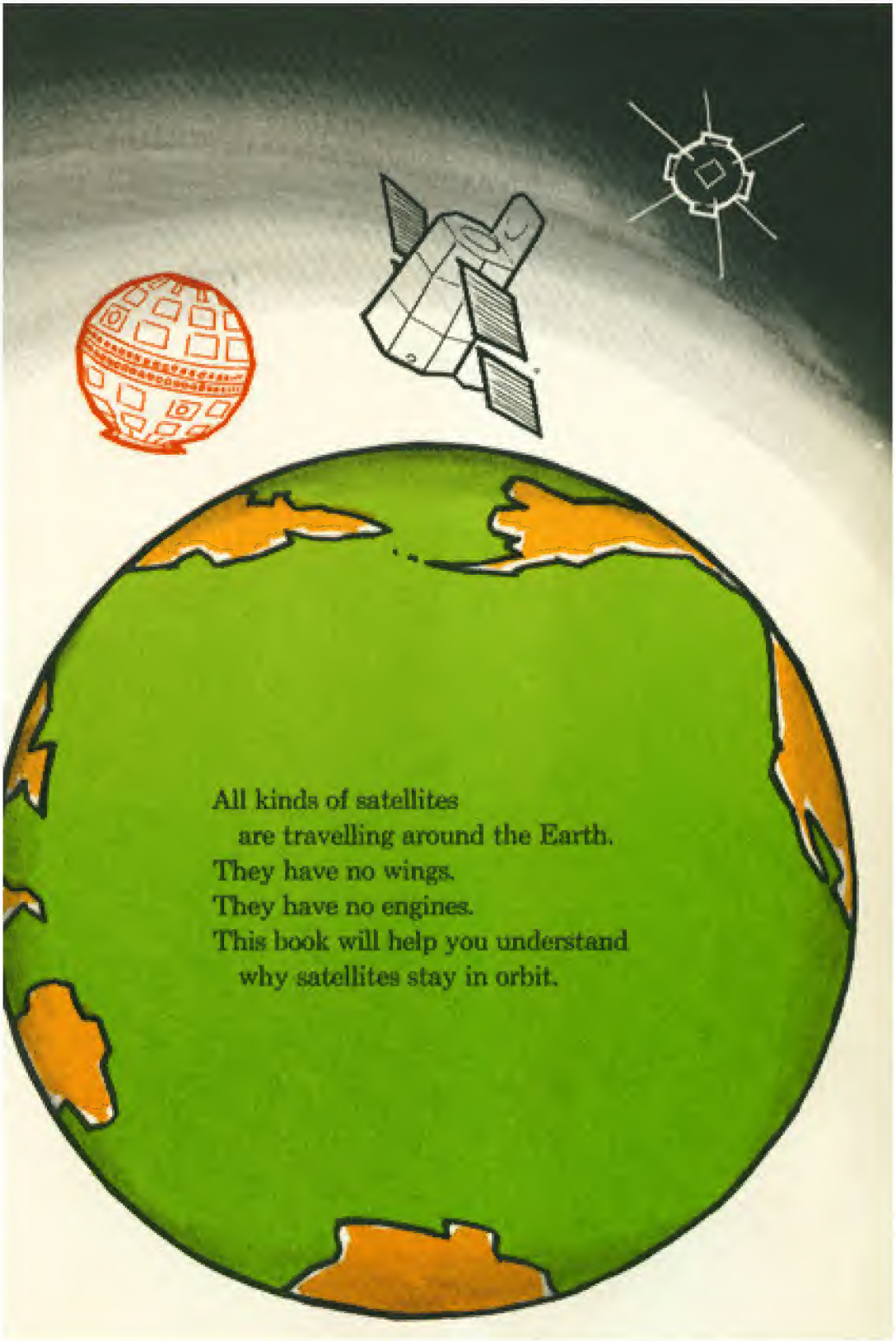


Look at the satellite,
high in the sky!
It travels around and around the Earth
without falling to the ground.



A bird has wings to keep it flying.
An airplane has an engine.
But a satellite has neither wings nor
engine.
Why does it stay in orbit,
travelling around the Earth?





All kinds of satellites
are travelling around the Earth.
They have no wings.
They have no engines.
This book will help you understand
why satellites stay in orbit.

There is an old saying,
"What goes up must
come down."
You know that this appears
to be true.
When you drop a ball from
your hand, it falls directly
to the ground.
Even when you throw a ball
up into the air, it is
pulled back to the ground.
The force that pulls the ball
back to the ground
is called gravity.

When you throw a football through the air,
it moves downward as well as forward.
Two forces are acting on the ball.
One force, which pulls the ball
toward the ground, is gravity.

The other force, which causes the ball to move forward,
is produced by your arm and body.
These two forces, acting on the ball at the same time,
cause the ball to travel in a curve toward the ground.

When you stand on top of a steep hill and throw
a football forward, the ball travels
in a larger curve.
You can see the curve of the ball in this picture.
Can you see how much smaller the curve would
be if the ground were level?

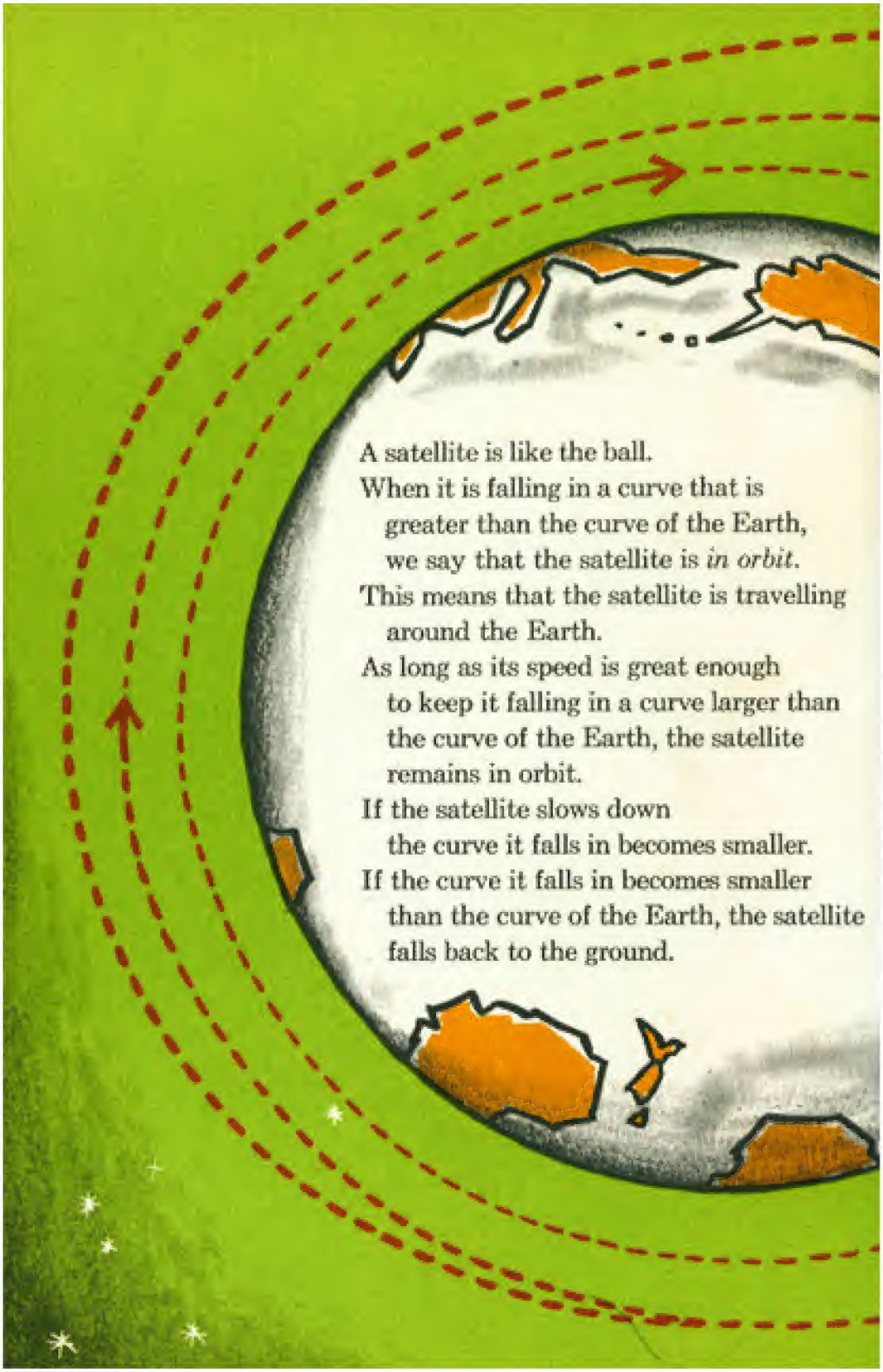

4

Imagine that you could stand
on a place *so* high
and throw the ball *so* hard
that the ball would move out
beyond the Earth's
atmosphere before it
started to fall.

In this picture you can see
that the curve in which the
ball is falling is larger than
the curve of the Earth.

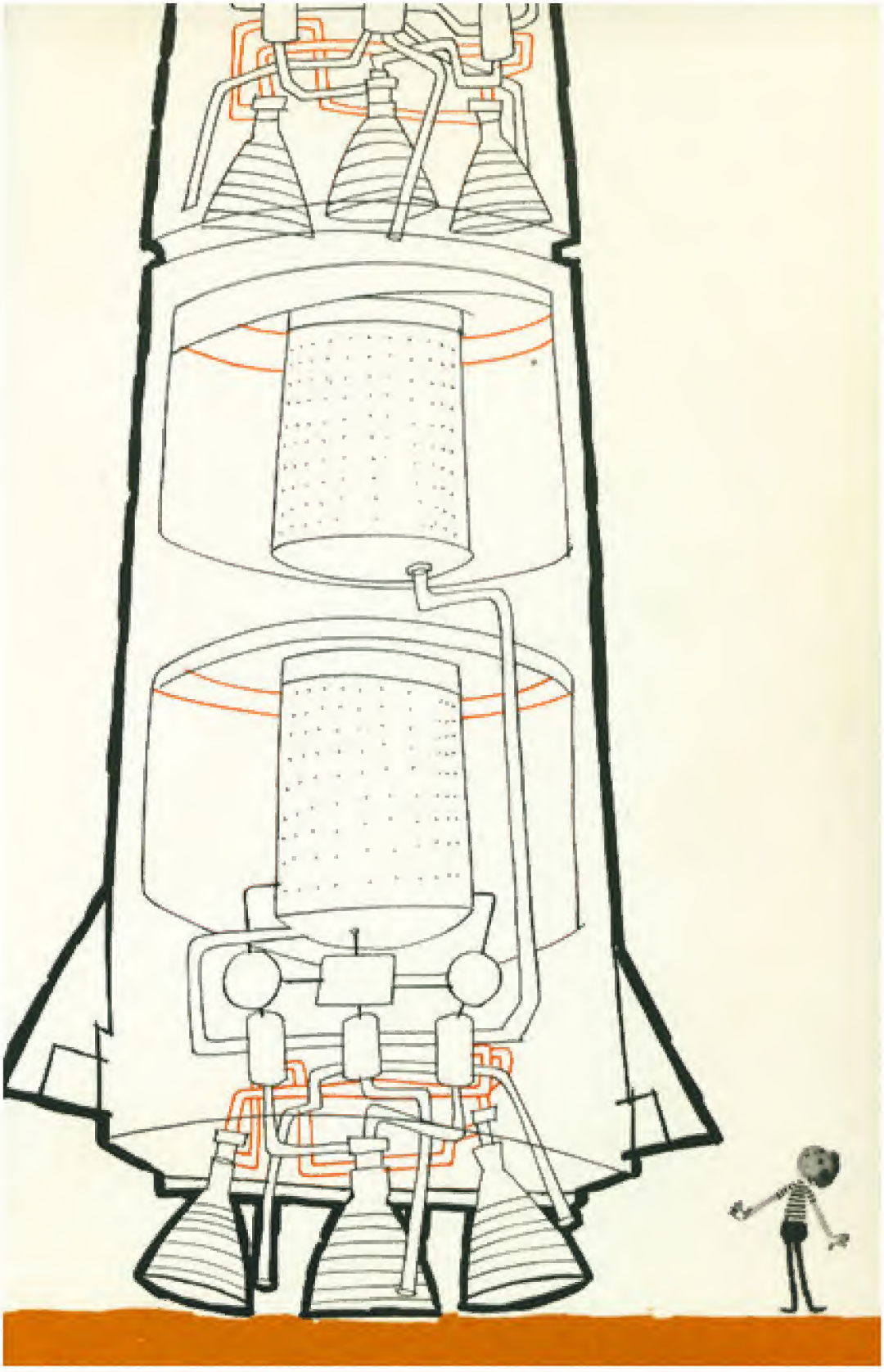
Remember, two forces are
acting on the ball: the force
that moves it forward,
and the force that pulls it
back toward the Earth.

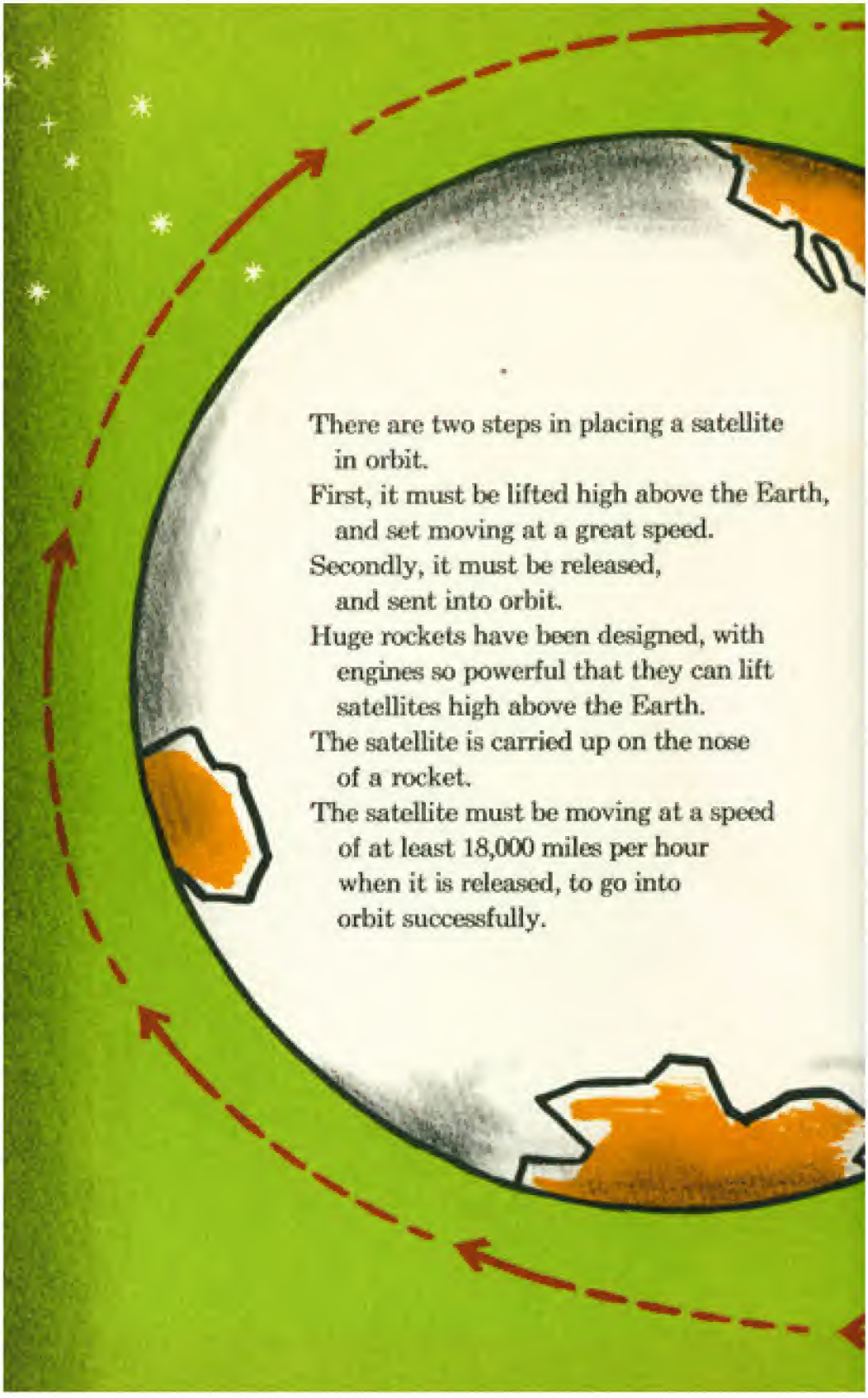
What do you think will
happen to the ball now?



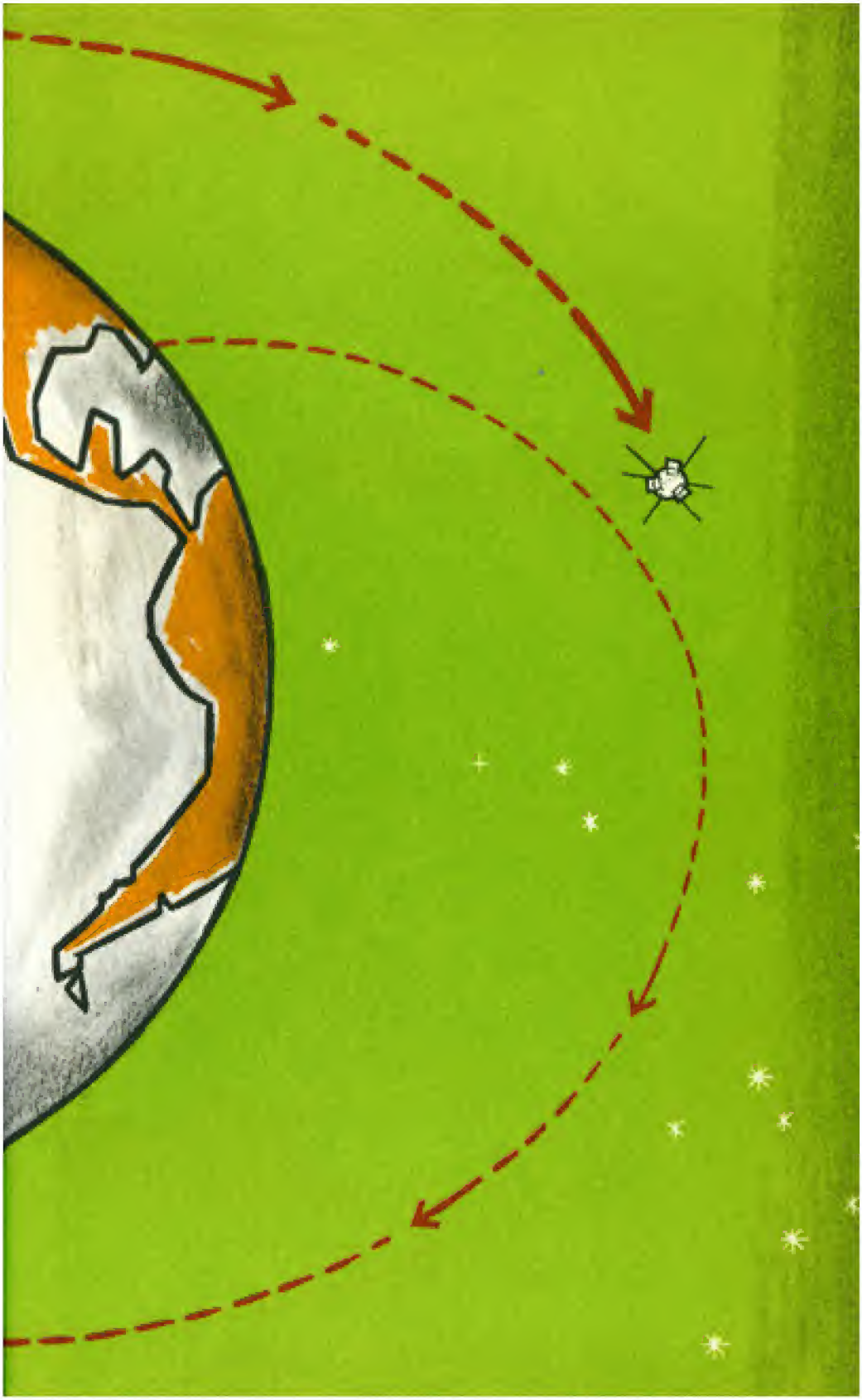
A satellite is like the ball.
When it is falling in a curve that is
greater than the curve of the Earth,
we say that the satellite is *in orbit*.
This means that the satellite is travelling
around the Earth.
As long as its speed is great enough
to keep it falling in a curve larger than
the curve of the Earth, the satellite
remains in orbit.
If the satellite slows down
the curve it falls in becomes smaller.
If the curve it falls in becomes smaller
than the curve of the Earth, the satellite
falls back to the ground.

You do not have the strength
to throw a ball high enough and hard enough
to send it into orbit.
Another force would have to be used.
We have a force that is strong enough to
send the ball into orbit.
This force is produced by the engines that push a rocket.
Rockets have engines so powerful that they can lift a
satellite high above the Earth and release it into orbit.





There are two steps in placing a satellite in orbit.
First, it must be lifted high above the Earth, and set moving at a great speed.
Secondly, it must be released, and sent into orbit.
Huge rockets have been designed, with engines so powerful that they can lift satellites high above the Earth.
The satellite is carried up on the nose of a rocket.
The satellite must be moving at a speed of at least 18,000 miles per hour when it is released, to go into orbit successfully.

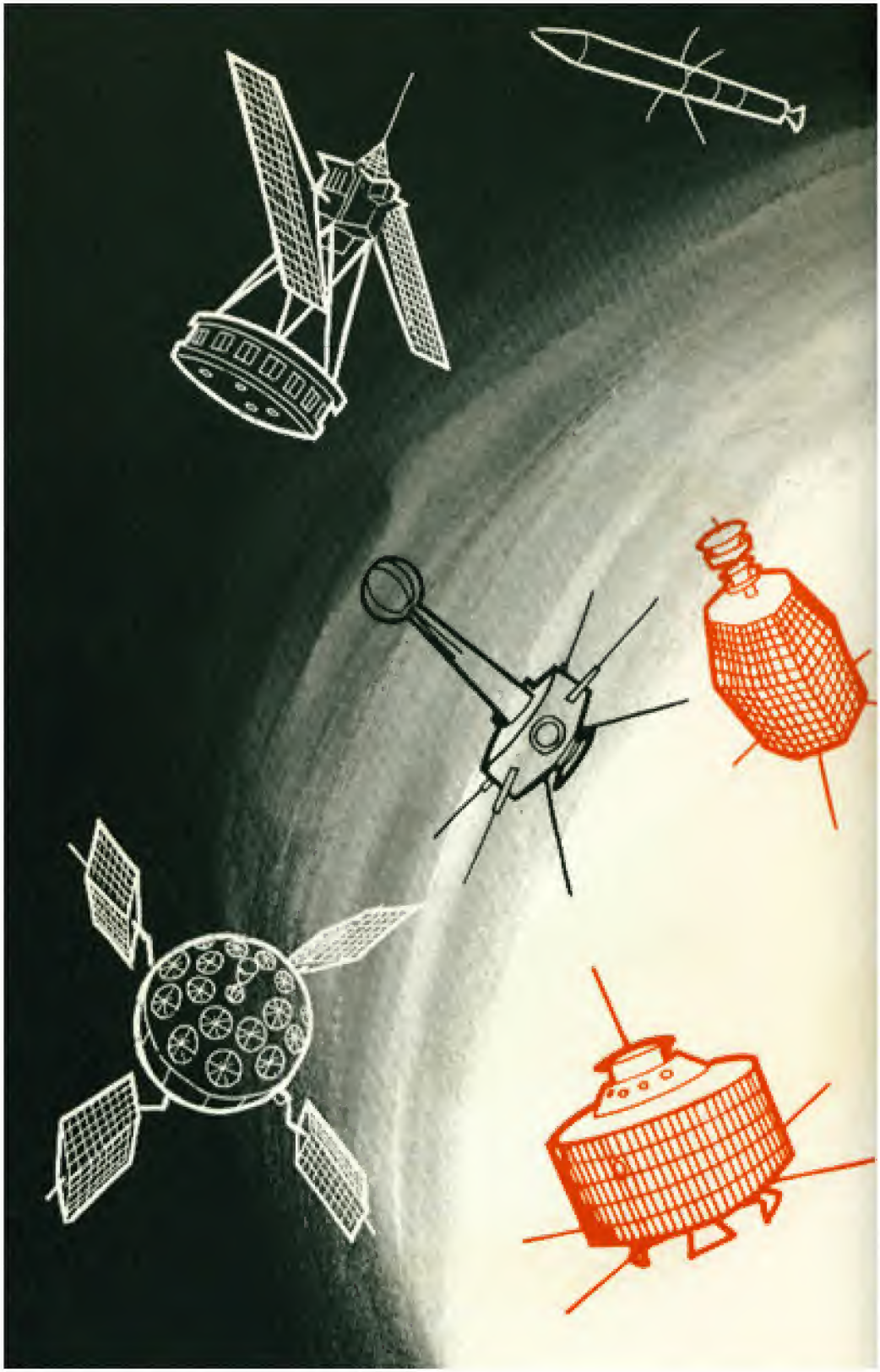


A satellite in orbit is really *falling*
around the Earth.
As it moves forward, it is pulled downward
by gravity.
But as long as the curve in which it moves
is larger than the curve of the Earth,
the satellite does not fall back to Earth.
Can you see why we say it is *falling*
around the Earth?

Space capsules that carry astronauts around the Earth are put into space just like any other satellite.

By slowing the speed of the space capsule with retro-rockets the space capsule is brought back to Earth.

Can you explain how retro-rockets work?



Satellites may be used for many different purposes.

Some carry television cameras that send back pictures of the clouds in the Earth's atmosphere. These pictures give valuable information about the weather.

Some relay radio messages and television pictures between continents, and from one country to another.

Some carry telescopes and other instruments out into space. These provide scientists with information that helps them carry on their studies and experiments.

What are some other uses of satellites?